

## **Mechanical and morphological properties of stearate modified layered double hydroxide blend with polyhydroxybutyrate/poly(lactic acid) nanocomposites**

### **ABSTRACT**

In this study, poly(3-hydroxybutyrate) (PHB)/poly(lactic acid) (PLA)/stearate modified magnesium aluminum layered double hydroxides (SMALDH) nanocomposites were prepared from PHB/PLA blend and SMALDH by solvent-casting method. The ratio of PHB/PLA was fixed at 90/10 as it gave the optimum tensile properties among the blends. Mg/Al layered double hydroxide (MALDH) was first synthesized via a co-precipitation method from nitrates salt solution and then modified with sodium stearate via an anion exchange process. X-ray diffraction (XRD) result showed an increase in d-spacing of MALDH from 7.88 to 30.26 Å after it was modified with sodium stearate, suggested that the intercalation of stearate ions into the interlayer of MALDH. The addition of 1.5 wt% of SMALDH improved the tensile strength and tensile modulus of PHB/PLA blend by 23% and 13%, respectively. Those improvements were attributed to the improved interfacial adhesion of blend components as illustrated in scanning electron micrograph. XRD result and transmission electron micrograph showed that the nanocomposites produced are of mixture intercalated/exfoliated types.

**Keyword:** Poly(3-hydroxybutyrate); Poly(lactic acid); Layered double hydroxides; Nanocomposites